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NEWS  3  Feb  1   Addition of Machine-Translated Abstracts to CAplus
NEWS  4  Feb 28   Patent Information Now Searchable in CAOLD
                  SDI/UPDATE SEARCH FIELD
NEWS  5  May  1   Beilstein Abstracts on STN - FILE BABS
NEWS  6  May  1   RN CROSSOVER AND ANSWER SIZE LIMITS INCREASED
NEWS  7  May  1   AIDSLINE has been reloaded
NEWS  8  May  1   Searching Y2-K compliant Patent Numbers
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NEWS 10  May 19   Weekly Statistics for New Entries now available
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NEWS 11  May 22   CITED REFERENCES NOW AVAILABLE IN CAPLUS AND CA FILE
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=> file inspec
FILE 'INSPEC' ENTERED AT 17:00:42 ON 20 JUL 2000
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FILE LAST UPDATED: 17 JUL 2000      <20000717/UP>
FILE COVERS 1969 TO DATE.

=> sic or silicon (w) carbide
          22976 SIC
         247220 SILICON
          19371 CARBIDE
           7791 SILICON (W) CARBIDE
L1        23851 SIC OR SILICON (W) CARBIDE

=> methylsilane or alkylsilane
            120 METHYLSILANE
             26 ALKYLSILANE
L2          146 METHYLSILANE OR ALKYLSILANE
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=> **l1 and l2**
L3 50 L1 AND L2

=> **plasma**
L4 217935 PLASMA

=> **l3 and l4**
L5 7 L3 AND L4

=> **d l5 ab**

L5 ANSWER 1 OF 7 INSPEC COPYRIGHT 2000 IEE
AB The production of organosilicon ions in a Freeman-type ion source were studied for **SiC** heteroepitaxial growth on a Si wafer. One of the possibilities for **SiC** epitaxy is a low energy deposition of an organosilicon ion beam. The advantage of this technique is that the organosilicon ion already has a binding of Si and C. The organosilicon ion usually also has a dipole moment which is useful for atomic arrangement on a depositing surface. **Methylsilane** and dimethylsilane were introduced in a Freeman-type ion source and discharged for ionization. Because of fragmentation, methylsilylene ions and methylsilicenium ions were produced. The ions were accelerated and mass selected in order to create a well defined ion beam. The energy distribution, measured by a **plasma** monitor, was +or-1 eV. By using this ion beam, heteroepitaxitial growth of 3C-**SiC** on Si was successfully created.

=> **d l5 1-7 ab st ct**

L5 ANSWER 1 OF 7 INSPEC COPYRIGHT 2000 IEE
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ST organosilicon ions production; Freeman-type ion source; heteroepitaxial growth; low energy deposition; organosilicon ion beam; atomic arrangement; **methylsilane**; dimethylsilane; discharged for ionization; fragmentation; methylsilylene ions; methylsilicenium ions; mass selected ions; energy distribution; **SiC**; Si
CT ION SOURCES; **PLASMA** CVD; SEMICONDUCTOR EPITAXIAL LAYERS; SEMICONDUCTOR GROWTH; SILICON COMPOUNDS; VAPOUR PHASE EPITAXIAL GROWTH; WIDE BAND GAP SEMICONDUCTORS

L5 ANSWER 2 OF 7 INSPEC COPYRIGHT 2000 FIZ KARLSRUHE
AB Amorphous hydrogenated Si-C (a-Si:C:H) films have a number of unique properties, and atomic hydrogen-induced CVD (AHCVD) is an attractive technique for producing such films. Here a number of **alkylsilane** precursors are examined. Only those containing Si-Si and Si-H bonds are capable of a-Si:C:H film formation. The AHCVD rate constants and the most abundant low molecular weight, gas-phase conversion products identified by GC-MS show that the initiation step involves cleavage of either Si-Si or Si-H bonds.
ST CVD; chemical vapour deposition; amorphous hydrogenated films; single source precursors; **alkylsilane precursors**; H bonds; semiconductor

growth; semiconductor thin films; wide band gap semiconductors; molecular structure; FTIR; ellipsometry; 75 Pa; 40 to 250 C; **SiC:H**; Si

CT AMORPHOUS SEMICONDUCTORS; ELLIPSOMETRY; FOURIER TRANSFORM SPECTRA; HYDROGEN; HYDROGEN BONDS; INFRARED SPECTRA; MOLECULAR CONFIGURATIONS; ORGANIC COMPOUNDS; **PLASMA** CVD; **PLASMA** CVD COATINGS; SEMICONDUCTOR GROWTH; SEMICONDUCTOR THIN FILMS; SILICON COMPOUNDS; WIDE BAND GAP SEMICONDUCTORS

L5 ANSWER 3 OF 7 INSPEC

AB Amorphous hydrogenated silicon-carbon films (a-Si:C:H) were produced by atomic hydrogen-induced chemical vapor deposition (CVD) using hexamethyldisilane (HMDS) and tetrakis(trimethylsilyl)silane (TMSS) as a single-source compounds. The CVD process has been examined in terms of the mechanism of the activation step. The susceptibility of particular bonds in the source compounds towards reaction with atomic hydrogen is characterized. The effect of substrate temperature (Ts) on the deposition rate, chemical structure, composition, surface morphology, as well as optical properties of the films, such as refractive index, optical band gap and photoluminescence, has been investigated. The increase of Ts from 30 to 400 degrees C causes the elimination of organic moieties from the film and the formation of compositionally and morphologically homogeneous inorganic material of Si-carbidic structure. The investigated optical properties of the film can be controlled by its stoichiometry or deposition temperature.

ST amorphous hydrogenated thin films; atomic H-induced chemical vapor deposition; **alkylsilane precursors**; hexamethyldisilane; tetrakis(trimethylsilyl)silane; single-source compounds; activation step; substrate temperature effect; deposition rate; chemical structure; composition; surface morphology; optical properties; refractive index; optical band gap; photoluminescence; elimination of organic moieties; carbidic structure; stoichiometry; **remote plasma CVD**; 30 to 400 C; **SiC**:**H**

CT AMORPHOUS SEMICONDUCTORS; BONDS (CHEMICAL); ENERGY GAP; HYDROGEN; PHOTOLUMINESCENCE; **PLASMA** CVD; **PLASMA** CVD COATINGS; REFRACTIVE INDEX; SEMICONDUCTOR GROWTH; SEMICONDUCTOR THIN FILMS; SILICON COMPOUNDS; STOICHIOMETRY; SURFACE STRUCTURE; WIDE BAND GAP SEMICONDUCTORS

L5 ANSWER 4 OF 7 INSPEC

AB Monocrystalline, epitaxial cubic (100) **SiC** films have been grown on (100) Si substrates at 750 degrees C, the lowest temperature reported to date, by low-pressure chemical vapor deposition, using **methylsilane**, SiCH3H3, a single precursor with a Si:C ratio of 1:1, and H2. Hexagonal **SiC** films were obtained with the aid of a remote H2 **plasma**, which also increased the deposition rate through a reduction in the activation enthalpy. The films were characterized by means of transmission electron microscopy, single-and double-crystal X-ray diffraction, infra-red absorption, ellipsometry, thickness measurements, four-point probe measurements, and other methods. Based on X-ray diffractometry, the crystalline quality of our beta -**SiC** films is equivalent to that of commercial films of similar thickness. We describe the novel growth apparatus and the properties of the films.

ST semiconductors; epitaxial films; low-pressure chemical vapor deposition; activation enthalpy; transmission electron microscopy; X-ray diffraction; infra-red absorption; ellipsometry; thickness measurements; four-point probe measurements; 750 degC; Si; **SiC-Si**

CT CHEMICAL VAPOUR DEPOSITION; ELLIPSOMETRY; INFRARED SPECTRA OF INORGANIC SOLIDS; SEMICONDUCTOR EPITAXIAL LAYERS; SEMICONDUCTOR GROWTH; SEMICONDUCTOR MATERIALS; SEMICONDUCTOR THIN FILMS; SILICON COMPOUNDS; TRANSMISSION ELECTRON MICROSCOPE EXAMINATION OF MATERIALS; X-RAY DIFFRACTION EXAMINATION OF MATERIALS

L5 ANSWER 5 OF 7 INSPEC

AB A study of the growth of a-**SiC**:H films by **plasma**-enhanced chemical vapor deposition (PECVD) from two organosilicon precursors, silacyclobutane (H2CH2SiCH2CH2 or SCB) and **methylsilane** (CH3SiH3), is

described. A capacitively coupled, parallel plate PECVD system was used to grow films at 250 degrees C and deposition pressure of 2.0 Torr. Standard (13.56 MHz) and low frequency (0.125 MHz) rf sources were used to generate the deposition **plasma**. Depositions were performed with and without argon dilution (neat) of the precursor. We report some of the first process/property relationships for organosilicon based a-**SiC**:H films grown using a fixed, controlled set of deposition conditions. Included are data on film composition, structure, dielectric constant and stress. Films deposited from silacyclobutane had much higher carbon concentrations than those deposited from **methylsilane**, but in both cases the carbon fraction in the film was lower than that in the precursor. It is found that the **plasma** drive frequency has a stronger influence on film composition than argon dilution of the precursor during deposition. The low frequency **plasma** significantly increases the film growth rate for the neat precursor process. Depending on the growth process, the relative dielectric constants of the a-**SiC**:H films ranged from 3.6 to 8.7. The variation of the dielectric constant over the frequency range 0.1-1000 kHz was negligible. All measured film stress was compressive and ranged from 0.1 to 1.0 GPa depending on precursor and **plasma** frequency. Films deposited from a 10% organosilicon/90% argon mixture showed higher dielectric constants, higher refractive indices and less bound hydrogen when compared to neat organosilicon precursor depositions. The films exhibited excellent oxidation resistance and could not be etched in 6:1 buffered HF solutions. The properties of the a-**SiC**:H films are compared to PECVD hydrogenated silicon nitride and discussed in the context of applications requiring low temperature deposited protective dielectric coatings.

ST **plasma-enhanced chemical vapor deposition**; **a-SiC:H films**; organosilicon precursors; PECVD; silacyclobutane; H2CH2SiCH2CH2; SCB; **methylsilane**; CH3SiH3; rf sources; **deposition plasma**; precursor; film composition; structure; dielectric constant; **plasma drive frequency**; compressive stress; refractive indices; oxidation resistance; 2.0 torr; 13.56 mHz; 0.125 mHz; 0.1 to 1000 kHz; 250 C; **SiC:H**

CT AMORPHOUS SEMICONDUCTORS; HYDROGEN; INTERNAL STRESSES; NONCRYSTALLINE STATE STRUCTURE; OXIDATION; PERMITTIVITY; **PLASMA** CVD; REFRACTIVE INDEX; SEMICONDUCTOR GROWTH; SEMICONDUCTOR THIN FILMS; SILICON COMPOUNDS

L5 ANSWER 6 OF 7 INSPEC

AB Hydrogenated amorphous **silicon carbide** (SixCyHz) films were synthesized by **plasma**-enhanced chemical vapor deposition using monomethylsilane (CH3SiH3) as the precursor. Silicon (100) wafers and gold foils were employed as substrates. A mass spectrometric analysis of the **plasma** showed that the advantage of using monomethylsilane relative to a silane-hydrocarbon mixture is that the majority of the Si-C bonds were preserved in the CH3SiH3 **plasma**. The composition and the morphology of the SixCyHz films was studied via X-ray photoelectron spectroscopy, Auger electron spectroscopy, and scanning electron microscopy as a function of the substrate temperature, composition of the ion flux bombarding the surface, and kinetic energy of these ions. The oxygen content of the films was found to decrease monotonically with increasing substrate temperature.

ST semiconductor; **methylsilane**; **plasma-enhanced chemical vapor deposition**; mass spectrometric analysis; bonds; composition; morphology; X-ray photoelectron spectroscopy; Auger electron spectroscopy; scanning electron microscopy; SixCyHz films

CT AUGER EFFECT; MASS SPECTRA; **PLASMA** CVD; SCANNING ELECTRON MICROSCOPE EXAMINATION OF MATERIALS; SEMICONDUCTOR GROWTH; SEMICONDUCTOR MATERIALS; SEMICONDUCTOR THIN FILMS; SILICON COMPOUNDS; X-RAY DIFFRACTION EXAMINATION OF MATERIALS

L5 ANSWER 7 OF 7 INSPEC

AB A new technique for the fabrication of pin amorphous-silicon solar cells in which the p-layer can be deposited by photo-CVD whereas the i- and n-layers are deposited by conventional **plasma** CVD has been developed.

Wide-bandgap, highly-conductive p-type a-**SiC**:H layers were obtained by direct photochemical vapor deposition from a mixture of disilane and **methylsilane** or acetylene. On these layers, i- and n-layers consisting of respectively of slightly-boron-doped, and phosphorus-doped amorphous silicon were successively deposited by glow-discharge decomposition in silane to form the pin structure. A considerable improvement of the carrier collection efficiency, especially in the short wavelength region, was observed in cells prepared by the new fabrication method, and a conversion efficiency of 9.46% was obtained.

ST amorphous semiconductor; a-Si:H; solar cells; **photochemical-plasma CVD**; **p-type a-SiC**:H; glow-discharge decomposition; pin structure; carrier collection efficiency; conversion efficiency

CT AMORPHOUS SEMICONDUCTORS; CHEMICAL VAPOUR DEPOSITION; ELEMENTAL SEMICONDUCTORS; **PLASMA** DEPOSITION; SEMICONDUCTOR GROWTH; SILICON; SILICON COMPOUNDS; SOLAR CELLS

=> **d l5 all**

L5 ANSWER 1 OF 7 Full-text? INSPEC COPYRIGHT 2000 IEE

AN 2000:6519283 INSPEC DN A2000-07-8115H-049; B2000-04-0520F-044

TI Production of organosilicon ions for **SiC** epitaxy.

AU Kiuchi, M. (Osaka Nat. Res.Inst., Japan); Matsumoto, T.; Mimoto, K.; Takeuchi, T.; Goto, S.

SO Review of Scientific Instruments (Feb. 2000) vol.71, no.2, pt.1-2, p.1157-9. 5 refs.
Doc. No.: S0034-6748(90)67802-X
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Conference: Proceedings of 8th International Conference on Ion Sources (ICIS'99). Kyoto, Japan, 6-10 Sept 1999

DT Conference Article; Journal

TC Experimental

CY United States

LA English

AB The production of organosilicon ions in a Freeman-type ion source were studied for **SiC** heteroepitaxial growth on a Si wafer. One of the possibilities for **SiC** epitaxy is a low energy deposition of an organosilicon ion beam. The advantage of this technique is that the organosilicon ion already has a binding of Si and C. The organosilicon ion usually also has a dipole moment which is useful for atomic arrangement on a depositing surface. **Methylsilane** and dimethylsilane were introduced in a Freeman-type ion source and discharged for ionization. Because of fragmentation, methylsilylene ions and methylsilicenium ions were produced. The ions were accelerated and mass selected in order to create a well defined ion beam. The energy distribution, measured by a **plasma** monitor, was +or-1 eV. By using this ion beam, heteroepitaxitial growth of 3C-**SiC** on Si was successfully created.

CC A8115H Chemical vapour deposition; A6855 Thin film growth, structure, and epitaxy; A5275R Plasma applications in manufacturing and materials processing; A0777 Particle beam production and handling; targets; B0520F Chemical vapour deposition; B2520M Other semiconductor materials

CT ION SOURCES; **PLASMA** CVD; SEMICONDUCTOR EPITAXIAL LAYERS; SEMICONDUCTOR GROWTH; SILICON COMPOUNDS; VAPOUR PHASE EPITAXIAL GROWTH; WIDE BAND GAP SEMICONDUCTORS

ST organosilicon ions production; Freeman-type ion source; heteroepitaxial growth; low energy deposition; organosilicon ion beam; atomic arrangement; **methylsilane**; dimethylsilane; discharged for ionization; fragmentation; methylsilylene ions; methylsilicenium ions; mass selected ions; energy distribution; **SiC**; Si

CHI SiC int, Si int, C int, SiC bin, Si bin, C bin; Si sur, Si el

ET C*Si; SiC; Si cp; cp; C cp; Si; C; C-SiC

=> **d 5 all**

L5 ANSWER 5 OF 7 Full-text? INSPEC COPYRIGHT 2000 IEE
AN 1994:4620496 INSPEC DN A9408-8115H-021; B9404-0520F-031
TI **Plasma**-enhanced chemical vapor deposition of a-**SiC**:H films from organosilicon precursors.
AU Loboda, M.J.; Seifferly, J.A.; Dall, F.C. (Dow Corning Corp., Midland, MI, USA)
SO Journal of Vacuum Science & Technology A (Vacuum, Surfaces, and Films) (Jan.-Feb. 1994) vol.12, no.1, p.90-6. 27 refs.
Price: CCCC 0734-2101/94/12(1)/90/7/$1.00
CODEN: JVTAD6 ISSN: 0734-2101
DT Journal
TC Experimental
CY United States
LA English
AB A study of the growth of a-**SiC**:H films by **plasma**-enhanced chemical vapor deposition (PECVD) from two organosilicon precursors, silacyclobutane (H2CH2SiCH2CH2 or SCB) and **methylsilane** (CH3SiH3), is described. A capacitively coupled, parallel plate PECVD system was used to grow films at 250 degrees C and deposition pressure of 2.0 Torr. Standard (13.56 MHz) and low frequency (0.125 MHz) rf sources were used to generate the deposition **plasma**. Depositions were performed with and without argon dilution (neat) of the precursor. We report some of the first process/property relationships for organosilicon based a-**SiC**:H films grown using a fixed, controlled set of deposition conditions. Included are data on film composition, structure, dielectric constant and stress. Films deposited from silacyclobutane had much higher carbon concentrations than those deposited from **methylsilane**, but in both cases the carbon fraction in the film was lower than that in the precursor. It is found that the **plasma** drive frequency has a stronger influence on film composition than argon dilution of the precursor during deposition. The low frequency **plasma** significantly increases the film growth rate for the neat precursor process. Depending on the growth process, the relative dielectric constants of the a-**SiC**:H films ranged from 3.6 to 8.7. The variation of the dielectric constant over the frequency range 0.1-1000 kHz was negligible. All measured film stress was compressive and ranged from 0.1 to 1.0 GPa depending on precursor and **plasma** frequency. Films deposited from a 10% organosilicon/90% argon mixture showed higher dielectric constants, higher refractive indices and less bound hydrogen when compared to neat organosilicon precursor depositions. The films exhibited excellent oxidation resistance and could not be etched in 6:1 buffered HF solutions. The properties of the a-**SiC**:H films are compared to PECVD hydrogenated silicon nitride and discussed in the context of applications requiring low temperature deposited protective dielectric coatings.
CC A8115H Chemical vapour deposition; A7720 Permittivity; A7820D Optical constants and parameters; A6855 Thin film growth, structure, and epitaxy; A7865J Nonmetals; A6860 Physical properties of thin films, nonelectronic; B0520F Vapour deposition; B2520F Amorphous and glassy semiconductors
CT AMORPHOUS SEMICONDUCTORS; HYDROGEN; INTERNAL STRESSES; NONCRYSTALLINE STATE STRUCTURE; OXIDATION; PERMITTIVITY; **PLASMA** CVD; REFRACTIVE INDEX; SEMICONDUCTOR GROWTH; SEMICONDUCTOR THIN FILMS; SILICON COMPOUNDS
ST **plasma-enhanced chemical vapor deposition**; **a-SiC:H films**; organosilicon precursors; PECVD; silacyclobutane; H2CH2SiCH2CH2; SCB; **methylsilane**; CH3SiH3; rf sources; **deposition plasma**; precursor; film composition; structure; dielectric constant; **plasma drive frequency**; compressive stress; refractive indices; oxidation resistance; 2.0 torr; 13.56 mHz; 0.125 mHz; 0.1 to 1000 kHz; 250 C; **SiC:H**
CHI SiC:H ss, Si ss, C ss, H ss, SiC bin, Si bin, C bin, H el, H dop

PHP pressure 2.7E+02 Pa; frequency 1.356E-02 Hz; frequency 1.25E-04 Hz; frequency 1.0E+02 to 1.0E+06 Hz; temperature 5.23E+02 K

ET C*H*Si; SiC:H; H doping; doped materials; Si cp; cp; C cp; H2CH2SiCH2CH2; H cp; CH3SiH3; C; F*H; HF; F cp; Si; C*Si; SiC

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